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Per D'ARIS H. DIERING

(Person authorizing change in classification and date)

By Excerpts from letter from Paul C. Fine to DAFOL FROMAN, DATED JULY 1, 1954.

(Signature of person making the change and date)

New York Operations Office"Aerial Monitoring of Fall-Out in Sea Water (Operation CASTLE)"

An initial attempt to locate and evaluate fall-out activity was made by placing a series of 300 rafts in the sector centered about the predicted path of the radioactive cloud resulting from the YANKEE shot.

"These rafts were placed in clusters of 10 on headings normal to the prediction, with five clusters per heading; the first line started at 30 miles from ground zero at Bikini Atoll. Six lines of rafts were laid in this manner, so that the rafts appeared at approximately 18° intervals throughout the sector, up to a distance of 130 miles.

"The individual rafts were composed of either polystyrene foam, 4 inches thick x 4 feet x 5 feet, or of 4-foot x 6-foot plywood units consisting of two sheets of plywood separated by two inflated tire inner-tubes, so that the upper sheet floated approximately 8 inches above the water. The rafts were impregnated with a low viscosity silicon oil, and approximately 50% of the units were dyed red and numerically identified. On D + 1, two search planes were sent out in an effort to locate the rafts; on that day approximately seven were found. These were mainly in the first two lines of clusters. On D + 3, approximately 20 rafts were located, of which only one had identification remaining. These rafts were also in the first two lines of rafts laid, and the re-identified raft was one of the group originally identified on D + 1. The position of the rafts had changed, due to the tidal drift, but the clusters were fairly compact. The location problem was serious, and, on this basis, further raft-dropping activity would seem to be inadvisable.

"In compliance with a request from the Scripps Oceanographic Institute Consultant, a heading was flown in the predicted fall-out using aerial survey techniques. It was possible to identify a path of activity, which by altitude change was identified with the sea water. The response on the detector indicated almost square wave characteristics with a width of activity measuring 9 miles. Data were then taken at 50 miles from ground zero and at 75 miles, with similar sharp areas of activity indicated. With but these three points, it was evident that the predicted wind trajectory could be identified with the radioactive fall-out and that a change of wind direction shortly after shot time might have existed since the data indicated a bow in the region of 25 miles.

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"As a result of this data, plans were made to take measurements on the NECTOR shot. A flight was made a N + 13 hours. Because darkness had set in, it was considered inadvisable to fly below 800 feet above sea level. The major part of the flight was taken at 1000 feet in the sector predicted for fall-out. The flight was completed at N + 17 hours. Even at 1000 feet the general trajectory of the fall-out could be determined. By dropping down to 800 feet, the measurement could be identified with sea water since the reading increased.

"At D + 1, two flights were sent out. The information was sent by radio to CTG 7.3, where the information was plotted. The path located the previous night was again measured, and precise data were secured from the air. Simultaneous surface sea-water samples were taken by sea-going tugs which were placed in the anticipated fall-out zone.

"There was no indication of fall-out beyond 150 miles from ground zero. On completion of the runs in the sector of major interest, the area around ground zero was swept by a series of chords within circles 25, 50, 100, and 150 miles in diameter. Two more lobes were located, of which one was of reasonably high intensity and pointing towards the west (possibly activity from the stem) and the second faced to the southwest and was of fairly low intensity. All the readings were no greater than 2 mr/hr above a background of 1 mr/hr in the planes. A single plane was sent out on D + 2, and the major lobe (NNE) was again located. The activity level had now dropped to 0.1 mr/hr above a background of 1 mr/hr in a plane. The area had spread somewhat, but the zone was clearly indicated. The westerly lobe had practically disappeared except for a small segment 40 miles from the atoll.

"One hundred twenty water samples have been brought to the NYOO Health and Safety Laboratory for analysis. Water samples relating to surface and depth were secured by NRDL for the YANKEE shot. The path located by a sea-going tug and the aerial survey are related; the water samples approximately match the spots where the airplane was flown.

"The data are being analysed and should be ready shortly for initial presentation.

"Stratospheric Air Dust Sampler - Stratospheric dust samples were obtained on approximately a weekly basis during the month of April. The sample for April 15 indicated a sharp rise in activity, having a peak reading of approximately 1 d/m/M<sup>3</sup>. This is approximately 200 times larger than the normal background readings. This activity decreased to about 50% of maximum value on April 22 and approximately down to 20% on April 27. It is believed that this activity was from the March 1 detonation and picked up on its second traverse around the earth. An analysis of the radioactive material indicates that it is approximately 35% strontium-39 and the remainder substantially strontium-90.

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"Permission to utilize the simulated high-altitude chamber at the Mitchell Air Force Base was received. Equipment is presently being set up for a precise calibration of the stratospheric air sampler at altitudes of 60-70,000 feet and 90-100,000 feet.

"Activities of the Analytical Branch -

"Special Projects

- a. The following samples from the Pacific Area were received for analysis:
  - (1) One case of marlin samples received from Dr. J. Lewis, American Embassy, Tokyo, Japan. These were run for total fission products, strontium, and barium.
  - (2) Approximately 70 urine samples received from the Marshall Islands, to be analyzed for total fission products and separate isotopes.
  - (3) Approximately 60 urine samples from Japanese fishermen were received and processed for total fission products. The results were in the neighborhood of 100 d/m/l (disintegrations per minute per liter), which are considerably below those obtained on the earlier sets. Further analyses of the first group are being performed at present to see if the components are those which would normally be found in urine.
- b. The following samples were received for the Sunshine Project.
  - (1) Approximately 300 pounds of soil and urine samples were received from Japan. These were collected by the Chief of the Analytical Branch during his recent trip there. They are to be processed for radio-strontium.
  - (2) Soil, vegetation, and water samples were received from Rongelap and Utirik and are to be analyzed for radiostrontium.

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